

# **MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT**

---

## **A BUSINESS PROCESS REVIEW OF THE SATELLITE ACCESS REQUEST, GATEWAY ACCESS REQUEST, AND REQUEST FOR SERVICES PROCESSES AT UNITED STATES TRANSPORTATION COMMAND**

**Michael L. Bramble-Major, United States Marine Corps  
B.S., United States Naval Academy, 1988**

**Master of Science in Information Technology Management-March 2001**

**Advisors: Mark E. Nissen, Graduate School of Business and Public Policy**

**Erik Jansen, Graduate School of Business and Public Policy**

The current emphasis on the implementation of e-business and automated solutions in the quest for increased efficiency accentuates the importance of Business Process Re-engineering. The existing method for processing Satellite Access Requests (SAR), Gateway Access Requests (GAR) and Requests for Services (RFS) at USTRANSCOM is an ideal candidate for review and innovation. The premise of this thesis is that Business Process Re-engineering, using information technology and other enablers of change, may produce quantum performance gains in these processes, particularly in terms of cycle time. Three redesign alternatives to the current process are developed using the Nissen methodology in conjunction with computer modeling and simulation tools. All three processes have tremendous potential to demonstrate dramatic reductions in cycle time, resulting in more efficient, streamlined satellite communications access request procedures at USTRANSCOM. The redesigns are based on delegation of authority, reducing the length of the process, and the introduction of an automated, web-based solution to streamline workflow and increase productivity. The research concludes that the SAR, GAR, and RFS processes can be dramatically improved through the application of an automated, information technology solution.

**DoD KEY TECHNOLOGY AREAS:** Command, Control and Communications, Materials, Processes and Structures, Modeling and Simulation

**KEYWORDS:** Business Process Re-engineering, Military Satellite Communications Access

## **WEB-ENABLED DOCTRINE: THE EVOLUTION OF A DYNAMIC DOCTRINE DEVELOPMENT PROCESS IN THE UNITED STATES NAVY**

**Joseph Fauth, IV-Lieutenant, United States Navy  
B.A., University of Texas at Austin, 1994**

**Master of Science in Information Technology Management-March 2001**

**Advisors: Erik Jansen, Graduate School of Business and Public Policy**

**Shelley Gallup, Institute for Joint Warfare Analysis**

The Navy envisions a dynamic development process for doctrine that produces accessible, timely, and relevant doctrine for the Fleet. The Navy Warfare Development Command (NWDC) in Newport, RI, recently has implemented information technology tools in the doctrine development process, creating the concept of Web-enabled Doctrine. This thesis analyzes Web-enabled Doctrine as the next step forward in the evolution of a dynamic doctrine process.

This thesis presents an historical study of doctrine in the U.S. Navy, a description of the Navy's doctrine development process over the past three decades, and an evaluation of the current system with respect to the characteristics of a dynamic process. Data on the current process and Web initiatives were gathered through interviews with current and former NWDC staff members.

The results indicate that NWDC has increased the level of responsiveness in the process, thus improving the relevance and timeliness of doctrine. Recommendations are made for increased accessibility to the system and the migration towards emerging commercial Web standards (XML).

**DoD KEY TECHNOLOGY AREA:** Command, Control, and Communication

**KEYWORDS:** Web-enabled Doctrine, Doctrine Development, Naval Doctrine History, Dynamic Doctrine

### **USING ON-LINE ANALYTICAL PROCESSING AND DATAMINING TO ESTIMATE EMERGENCY ROOM ACTIVITY IN DOD MEDICAL TREATMENT FACILITIES IN THE TRICARE CENTRAL REGION**

**Cary V. Ferguson-Captain, United States Army**

**B.B.A., University of Notre Dame, 1990**

**Master of Science in Information Technology Management-March 2001**

**Advisors: Daniel R. Dolk, Information Sciences Academic Group**

**Samuel E. Buttrey, Department of Operations Research**

On-line Analytical Processing (OLAP) and datamining can greatly enhance the ability of the Military Medical Treatment Facility (MTF) emergency room (ER) manager to improve ER staffing and utilization. MTF ER managers use statistical data analysis to help manage the efficient operation and use of ERs. As the size and complexity of databases increase, traditional statistical analysis becomes limited in the amount and type of information it can extract. OLAP tools enable the analysis of multi-dimensional data, which can give the user access to previously undiscovered information. Data mining has the capability to break large sets of data down into groups by classifications, associations, and clusterings to transform previously meaningless data into useful information.

This research presents a brief overview of the DoD medical system, OLAP, and datamining. OLAP and datamining tools then analyze a data set containing two years of MTF ER data from the TRICARE Central Region. The results of these analyses provide insight on the predictive capabilities, advantages, and disadvantages of applying OLAP and datamining to MTF ER data.

**DoD KEY TECHNOLOGY AREA:** Computing and Software

**KEYWORDS:** On-Line Analytical Processing (OLAP), Data Mining, Medical Treatment Facility (MTF), Emergency Room

### **USING INFORMATION TECHNOLOGY IN THE NAVY LESSONS LEARNED SYSTEM TO IMPROVE ORGANIZATIONAL LEARNING**

**Michael J. Garvey-Lieutenant, United States Navy**

**B.A., University of Binghamton, 1991**

**Master of Science in Information Technology Management-March 2001**

**Advisors: Erik Jansen, Graduate School of Business and Public Policy**

**Shelly Gallup, Institute for Joint Warfare Analysis**

Organizations are becoming increasingly aware that learning can be a source of competitive advantage. The United States Navy is not immune to this realization and has established the Navy Lessons Learned System (NLLS) as the singular Navy program for the collection, validation, and distribution of unit feedback. NLLS provides naval personnel a means to share observations, document deficiencies, convey solutions, and innovate tactics, techniques, or procedures (TTP). The purpose of this thesis is to examine the various factors that influence organizational learning, such as structure, environment, and culture, and to examine how information technology can be used to support or enhance organizational learning in the Navy. The research concludes that NLLS has improved organizational learning but has not attained as widespread use

as is possible. Recommendations are provided to improve the program as well as increase NLLS exposure to the fleet and to the potential users of the system.

**DoD KEY TECHNOLOGY AREA:** Manpower, Personnel, and Training

**KEYWORDS:** Information Systems, Organizational Learning, Navy Lessons Learned System, Information Technology

### **USING OPERATIONAL RISK MANAGEMENT (ORM) TO IMPROVE COMPUTER NETWORK DEFENSE (CND) PERFORMANCE IN THE DEPARTMENT OF THE NAVY (DON)**

**Ernest David Hernandez-Lieutenant Commander, United States Navy  
B.S., United States Naval Academy, 1985**

**Master of Science in Information Technology Management-March 2001**

**Advisors: Rex Buddenberg, Information Systems Academic Group  
Daniel Warren, Department of Computer Science**

Operational Risk Management (ORM) has been credited with reducing the Navy's mishap rate to all time lows, especially in Naval Aviation. Through the use of a five-step process, ORM has been able to change the decisionmakers' paradigm of day-to-day operations in naval fleet units, making safety the paramount factor that would allow fleet commanding officers to conserve their assets, yet meet the requirement to train in high-risk environments. ORM is a process that mitigates the risk associated with the high-risk environment that naval fleet units operate in.

Not unlike naval fleet units, our computer networks operate in a high-risk environment-the Internet. Crackers are able to penetrate what were thought to be secure networks, and copy, modify, disrupt or destroy valuable information. The risk posed to the Navy's computer network systems is very great. Given the Navy's adoption of "Network-Centric Warfare" and the Navy-Marine Corps Intranet (NMCI), the hazards faced by the possible compromise of these computer network systems are as great as any a fleet unit would encounter in its normal operating environment.

The objective of this thesis is to translate ORM practices into Information Assurance Risk Management (IARM) practices, and demonstrate IARM's utility in identifying, quantifying, and mitigating the security risks associated with computer networks.

**DoD KEY TECHNOLOGY AREA:** Computing and Software

**KEYWORDS:** Computer Network Defense (CND), Operational Risk Management (ORM), Critical Infrastructure Assurance, Information Assurance Risk Management (IARM), Information Security Policy and Information Assurance

### **THE ANALYSIS, DESIGN, AND IMPLEMENTATION OF THE DEFENSE MANPOWER DATA CENTER PAY DATA WAREHOUSE**

**Tara L. Lutman-DoD Civilian**

**B.S., Santa Clara University, 1995**

**Master of Science in Information Technology Management-March 2001**

**Advisors: Magdi Kamel, Information Systems Academic Group**

**Deborah P. Davis, Department of Defense**

**Dean E. Parker, Oracle Corporation**

This thesis discusses a five step methodology for developing a data warehouse: data model development, defining data sources, data cleansing and integration, populating the warehouse, and providing query access. Specifically, it describes how those steps were employed to design and implement a Department of Defense (DoD) Pay Data Warehouse for the Defense Manpower Data Center (DMDC).

The objective was to define the requirements needed to implement a data warehouse that would be used to store and report on Active Duty Pay, Reserve Pay, DoD Civilian Pay, and Military Retired Pay data as submitted to DMDC by the Defense Finance and Accounting Service (DFAS) and the Coast Guard Pay and Personnel System. Using database technologies, Computer Aided Software Engineering (CASE) tools,

and Query and Report tools, a Pay Data Warehouse was designed and slated for implementation and integration with an already designed Personnel Data Warehouse.

The design and implementation of the Pay Data Warehouse will improve the data quality, standardization, and data access procedures for DMDC. As a result, data requests submitted of the twenty-year-old archives will be executed more efficiently and return more accurate data than is currently possible.

**DoD KEY TECHNOLOGY AREAS:** Computing and Software, Other (Data Warehouse)

**KEYWORDS:** Data Warehouse, Database, Data Warehouse Development Methods, Defense Manpower Data Center

### ENHANCING TRADITIONAL CLASSROOM INSTRUCTION THROUGH COMPUTER MEDIATED COMMUNICATIONS

Michele L. Ruppert-Lieutenant, United States Navy  
B.S., University of Florida, 1991

M.S., Florida Institute of Technology, 1995

Master of Science in Information Technology Management-March 2001

Advisors: Douglas E. Brinkley, Graduate School of Business and Public Policy

William J. Haga, Graduate School of Business and Public Policy

This thesis examines the enhancement of traditional classroom instruction through the use of computer mediated communications (CMC). It explores student and instructor involvement with the use of CMC technology. Students must interact with fellow students and the teaching faculty to learn and CMC technology will facilitate this interaction. Previous research on CMC is surveyed. The CMC climate in a graduate level course is examined. The findings indicate that CMC may improve the pedagogical course framework. Recommendations include a policy stating traditional courses will be taught with CMC technologies, traditional courses should be structured properly with both course materials and CMC technologies and a training program must be implemented for both the teaching faculty and students.

**DoD KEY TECHNOLOGY AREAS:** Computing and Software, Other (Information Systems)

**KEYWORDS:** Collaborative Learning, Collective Learning, Cooperative Learning, Computer Mediated Communication, Computer Mediated Learning, Computer Supported Collaborative Learning, Group Communication, Group Interactivity, Group Learning, Human-Computer Interaction, Learning Collaboration, Learning Interaction, Online Communication, Online Groups, Online Interactivity, Peer Group Learning, Study Circles, Syndicates, Team Learning

### QUALITY OF SERVICE FOR IP-BASED NETWORKS

Konstantinos Sambanis-Lieutenant, Hellenic Navy

B.S., Hellenic Naval Academy, 1989

Master of Science in Information Technology Management-March 2001

Master of Science in Computer Science-March 2001

Advisors: Gilbert M. Lundy, Department of Computer Science

Rex A. Buddenberg, Information Systems Academic Group

In recent decades, the networking community has been looking for strategies to converge over a single common network infrastructure carrying voice, video and data. The pervasive and ubiquitous packet-based IP network provides the most convenient platform for the desirable convergence, where resources can be managed in an efficient and dynamic manner.

The gradual convergence into the IP infrastructure introduces multimedia-rich and interactive applications that are bandwidth-intensive and delay-bound, while more sophisticated data applications are deployed that place new demands onto IP networks. The IP-based network is evolving to satisfy the requirements of traffic differentiation and reliable service. Quality of Service (QoS) mechanisms are introduced to meet the traffic expectations and enhance the basic service model of the network in many subtle ways.

This thesis provides a comprehensive examination of QoS mechanisms and protocols that have surfaced to optimize the utilization of network resources, to provide differentiated treatment of traffic and enforce the appropriate policies. The study proposes a balanced approach of bandwidth increase and integration of robust QoS techniques into existing IP network infrastructure to arrive at a convergent, multiservice and scalable telecommunications network. Findings from this thesis can be incorporated into the design and implementation of an integrated network within a large organization that will deliver accurate services and defined levels of performance.

**DoD KEY TECHNOLOGY AREAS:** Computing and Software, Command, Control, and Communications

**KEYWORDS:** Networking, Convergence, Quality of Service, IP Multi-Service Network, Policy-based Network, Traffic Management

### **WEB-BASED NETWORK MANAGEMENT CONFIGURATION FOR THE INDONESIAN EASTERN FLEET WIDE AREA NETWORK**

**Halomoan Sipahutar-Lieutenant Colonel, Indonesian Navy**

**B.S., Indonesian Naval Academy, 1982**

**Master of Science in Information Technology Management-March 2001**

**Advisors: John Osmundson, Command, Control, Communications, Computers,  
and Intelligence Academic Group**

**Rex Buddenberg, Information Systems Academic Group**

This thesis presents a model of an integrated wide area network using web-based network management to support fleet operations of the Indonesian Eastern Fleet. It surveys possibilities for improving the Indonesian Eastern Fleet's computer communications network systems to provide a fast, reliable, and effective way of gathering and distributing information to all fleet units. A standardized LAN infrastructure and the use of an appropriate network hardware and software was recommended to achieve connectivity of all main naval base LANs in an integrated WAN. This thesis provides a design of the Indonesian Eastern Fleet WAN that was tested using a leading edge simulation tool, EXTENDv4.

**DoD KEY TECHNOLOGY AREA:** Command, Control, and Communications

**KEYWORDS:** EXTENDv4 Software Simulation Program, Local Area Network, Wide Area Network, Web-Based Technology, Web-Based Network Management

### **A DATABASE OF ADVERSARY DECISION MAKERS**

**Tyrone L. Ward-Lieutenant, United States Navy**

**B.S., Elizabeth City State University, 1993**

**Masters of Science in Information Technology Management-March 2001**

**Advisors: Daniel R. Dolk, Information Systems Academic Group**

**LT Raymond R. Buettner, Jr., USN, Information Warfare Academic Group**

Advances in database and decision technologies provide abundant opportunities for implementing decision support systems for Information Operations specialists. This thesis describes, designs, and partially implements a system that provides information about adversary decision makers and the media they access. The Adversary Decision Maker Systems (ADMS) consists of a relational database and associated user interface of forms and reports, implemented in Microsoft Access<sup>TM</sup>. The database design and development process is elaborated in detail, database administration guidelines are documented, and a migration path is presented for incorporating relevant decision support tools to augment the database. A decision support system, the Situational Influence Assessment Module (SIAM), which is based upon influence diagrams and belief networks, is used to demonstrate how the database and decision technologies can be integrated. The

ADMS developed in this thesis meets the requirements of USPACOM, yet is general enough to be used for any theater commander's Area of Responsibility (AOR).

**DoD KEY TECHNOLOGY AREA:** Other (Information Operations)

**KEYWORDS:** Information Systems, Database Technology, Decision Support Systems

### **IMPACT OF THE IMPLEMENTATION OF INFORMATION TECHNOLOGY ON THE CENTER FOR ARMY LESSONS LEARNED**

**Anthony M. Wizner-Captain, United States Army**

**B.S., United States Military Academy, 1991**

**Master of Science in Information Technology Management-March 2001**

**Advisor: Erik Jansen, Graduate School of Business and Public Policy**

**Second Reader: Shelley Gallup, Institute for Joint Warfare Analysis**

As today's Army moves further into the Information Age and its mission evolves into a CONUS-based, Fore Projection Army with diverse mission requirements, the ability to collect and disseminate lessons learned never has been more important. Units must be able to use the lessons of those soldiers who have preceded them in order to maximize force multipliers, execute missions, right the first time, and save lives.

This research evaluates the impact that the implementation of an Information Technology infrastructure has had on the efficiency of Army's Lessons Learned Process and the overall effectiveness of the Center for Army Lesson Learned to conduct its primary mission. The objective is to determine how Information Technology has changed the organizational structure, culture, reward systems, processes, and personnel skill requirements within CALL.

Research includes an in-depth review of CALL as the Army's mechanism for creating organizational learning, a description of the Lessons Learned Process, an efficiency comparison between the current and previous collection, an analysis of dissemination processes using Extend Simulation Software, and an explanation of the organization's current IT architecture.

**DoD KEY TECHNOLOGY AREA:** Manpower, Personnel, and Training

**KEYWORDS:** Learning Organization, Information Technology, Organizational Design, Center for Army Lessons Learned, Information Technology Architecture, Center for Army Lessons Learned, Collection and Observation Management Software